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EXAMINER	
RUGGLES, JOHN S	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/649,310	LIN, CHENG-MING	
	Examiner	Art Unit	
	John Ruggles	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 September 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *40,42-50 and 53* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *40,42-50 and 53* is/are rejected.

7)☒ Claim(s) *42 and 44-47* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

In the current 9/11/07 amendment submission, claims 1-39, 41, 51-52, and 54-67 remain as previously cancelled, claims 40, 44-47, and 53 are currently amended, and claims 42-43 and 48-50 remain as previously presented. Therefore, only claims 40, 42-50, and 53 remain under consideration as currently amended.

The previous exemplary objection to the specification numbered (10) and the previous rejection of claim 53 under the second paragraph of 35 U.S.C. 112 are each withdrawn in view of the current amendment and accompanying remarks. However, a new objection to claims 42 and 44-47 is set forth below. Also, the previous art rejections of the remaining claims under 35 USC 103(a) are revised below as necessitated by the current amendment and accompanying remarks.

Applicant's arguments with respect to the amended claims have been considered, but they are either moot or unpersuasive in view of the revised ground(s) of rejection set forth below, which are necessitated by Applicant's current amendment.

Therefore, this Office action is now made FINAL.

Claim Objections

Claims 42 and 44-47 are objected to because of the following informalities: (1) in claim 42 line 5, "the second attPS-layer thicknesses D_3" (plural) must be corrected to --the second attPS-layer ~~thicknesses~~ thickness D_3-- (singular), in order to be consistent with the singular form recited in claim 40 (from which claim 42 depends). Claims 44-47 depend from claim 42. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 40 and 48-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doi et al. (US 5,527,647), in view of Tanaka et al. (US 2002/0022184) and either Hasegawa et al. (US 6,677,107) or Itoh (US 2003/0184721), further in view of either Dove et al. (US 5,939,225) or Mitsui et al. (US 6,242,138), and further in view of Chen (US 6,274,281).

Doi et al. teach a phase shifting mask (PSM) having a thinned halftone or attenuating PS (attPS) layer and a method of manufacturing it (title, abstract). Such an attPS is contemplated for improving photolithographic resolution to increase miniaturization of circuit patterns to manufacture a semiconductor device (c1/L13-19). In the method of manufacturing the attPSM, the attPS layer is reduced in thickness from an initial thickness 20 (analogous to the instant initial thickness D_0) to a first thickness 19 (analogous to the instant first thickness D_1) by dry etching (of which reactive ion etching (RIE) is a known type, c1/L44-45, *instant claims 48-49*) or wet etching to transmit the desired amount of exposure light (e.g., T = 5% to 15%, etc., at the desired wavelength of exposure light) and patterned by selective dry etching (RIE is a known type, *instant claim 50*) or wet etching of grooves or trenches 15 (as clear areas) through the attPS layer into the transparent substrate 11 at 16, as shown in Figure 3I (c4/L26-29, 39-49). The PS obtained for various embodiments is 180° (e.g., c4/L61, etc.).

Doi et al. do not specifically teach: *[1]* that the initial thickness D_0 of the attPS layer before thinning would be suitable for a first wavelength λ_0 and that the thinning would make it suitable for a second wavelength λ_t that is smaller or shorter than the first wavelength λ_0 ($\lambda_t < \lambda_0$); *[2]* that a part of the attPS layer with a second thickness D_3 remains at the clear areas of the attenuated PSM, wherein the second thickness D_3 is less than the previous first thickness D_1 of this attPS layer ($D_3 < D_1$); nor *[3]* that the initial thickness attPS layer is on a prefabricated mask blank (e.g., prefabricated by a first company, which is different from a second company manufacturing the attPSM from the prefabricated mask blank, etc.).

However, it is a known and even a common practice for a prefabricated mask blank and the resulting patterned mask to be made or fabricated separately (e.g., by different companies or manufacturers, etc.), as taught by either Hasegawa et al. (c25/L1-11) or Itoh ([0046]).

Furthermore, Tanaka et al. teach several exemplary types of business and management transactions (e.g., to obtain profits while advancing the saving of environmental resources, etc.) between a first company that prepares or remanufactures and then supplies prefabricated mask blanks according to their quality or grade for use with a suitable (first) exposure wavelength (analogous to the instant first wavelength λ_0) and a different second company that then uses the supplied prefabricated mask blanks to make or manufacture patterned masks (e.g., the patterned masks are further used for making integrated circuits or other patterned devices by either the second company or yet another different (third) company, etc. [0327]-[0339] *[3]*). The cost of prefabricated mask blanks designed or adapted for use with shorter exposure wavelengths, such as 193nm or even 157nm, are more expensive than those adapted for use with longer exposure wavelengths [0004]. Normal mask blank remanufacturing is known to include thinning of the

mask blank [0007]. Also, it is described that a "shade film" or dark film region on a mask or mask blank generally has a transmittance (T) of ≤ 40% for the exposure light (at a target wavelength), whereas a "transparent" or clear region on a patterned mask has T ≥ 60% [0209]. The target exposure wavelengths alternatively include 248nm, 193nm, or 157nm [0224] and the shading or absorbing materials include resist, metals, metal nitrides, or metal silicides [0226].

Also, it has been known for some time that an attPS layer at a first thickness (analogous to instant initial thickness D_0) that is suitable for a desired transmittance (e.g., T = 5% to 15%, etc.) at a first wavelength (analogous to instant λ_0) could be made suitable (and would therefore be reasonably expected to be predictably suitable) for the same desired transmittance at a second wavelength (analogous to instant λ_t) that is shorter than the first wavelength (reading on $\lambda_t < \lambda_0$) by simply reducing the thickness of the attPS layer (see Dove et al., Figures 6, 8, and 10, c4/L29-49, c5/L7-11). Figure 6 shows transmittance (T, %) of an attPS layer material (SiC-N) as a function of wavelength (λ, nm) for thicknesses (D) of 50nm, 100nm, and 150nm. For this attPS layer material, ~10% T can be obtained at a first wavelength (λ_0) of about 280nm for a first thickness (D_0) of 150nm, while ~10% T can also be obtained for this same attPS layer material at a second wavelength (λ_t) of about 200nm for a second thickness (D_1) of 50nm (reading on $\lambda_0 > \lambda_t$). Figure 8 shows a similar relationship of ($MoSi_2$-O_2) attPS layer material T (%) as a function of λ (nm) for thicknesses (D) of 175nm, 225nm, and 250nm. For this attPS layer material, ~5% T would be achieved at λ_0 of ~255nm for D_0 = 250nm, while ~5% T would also be achieved at λ_t of ~230nm for D_1 = 175nm. Figure 10 shows that for a MoO_3 attPS material, ~20% T would be observed for D_0 = 200nm at λ_0 of ~370nm, while ~20% T would also be observed for D_1 = 25nm at λ_t of ~250nm (reading on $\lambda_0 > \lambda_t$).

Alternatively, Mitsui et al. teach a halftone (attenuated) phase shift mask (attPSM), a method of manufacturing an attPSM, and an attPSM blank therefore (title, abstract, c1/L11-19). This attPSM satisfies various optical characteristics (e.g., light (optical) transmission, amount of phase shift (PS), etc.) with high precision, as well as reducing defects in the thin film of a light translucent or semi-transparent portion (abstract, c1/L45-56), which is understood to mean an attPS layer 3a formed over a transparent substrate layer 1 (as shown in Figure 2, c7/L8-10). A typical conventional halftone (attenuated) PSM has a transparent substrate 1, a clear light transmitting portion 2, and an attenuating PS (attPS) portion 3, which is shown by Figure 1(a) and described at c1/L57-66. The transparent substrate is made of clear material (e.g., quartz, etc., c5/L65) and the light (optical) transmission T of the attPS layer to the exposure light is preferably about 2% to 20% (c5/L15-17). A lower optical transmission T is preferable for line and space patterns, while a higher optical transmission T is preferable for hole system patterns (c5/L21-24). Figure 6 shows a graph for the dependency of light (optical) transmission (T, %) as a function of the wavelength (λ) of exposure light (e.g., T = 5% at λ = 248nm, T = 19% at λ = 365nm, T = 40% at λ = 488nm, etc., c8/L13-25) through an attPSM blank having a constant thickness (e.g., 931 Angstroms (Å), etc.) of a MoSiON attPS layer for a PS = 181° (Figure 5, c8/L10-13). Figure 5 also shows that for the same exposure wavelength (λ = 248nm) and nearly the same or slightly smaller PS (180°), increasing the thickness of the MoSiON attPS layer from 931 Å (93.1nm) to 1378 Å (137.8nm, Comparative Example No. 1) decreases the transmission (T) of exposure light from 5% to 2%, respectively (c8/L26-44). Thus, (optical) transmission T decreases with decreasing wavelength λ, but T increases with decreasing thickness of the attPS layer, and the amount of PS is nearly the same (approximately equal) or increases with

decreasing thickness of the attPS layer. The method of manufacturing or fabricating the attPSM from an attPSM blank (e.g., having a MoSiON attPS layer, etc.) involves patterning a resist on the attPS layer of the attPSM blank, then removing portions of the attPS layer through the resist pattern by etching (e.g., using dry etching with a gas including CF_4, etc., c9/L18-25, c10/L3-8, c10/L22-28).

It is also known to make an attenuated phase shift mask (attPSM) having a part of the attPS layer with a second thickness (analogous to instant second thickness D_3) remaining at the 0° (clear) areas having relatively low light absorption between densely spaced lines or features of the attPSM, in which the second thickness (D_3) at clear areas is less than the previous first thickness (analogous to instant first thickness D_1) of this layer at dark areas having relatively high light absorption (as taught by Chen, abstract). Chen describes an attPSM made by coating a resist 60 on a mask blank having a PS material 45 on light absorbing semi-transparent (attenuating) layer 43 (with a first thickness 49 for a first transmittance of about 4% to 20%, which is analogous to instant D_1 at dark areas having a (first) transmittance (T_1) at dark areas) on a transparent substrate 40 (as shown by Figure 4), patterning the resist 60 (e.g., by electron beam, etc., as shown in Figure 5), then etching through the resist to only partially etch through and reduce the thickness of the attenuating layer 43 (at positions 46, down to a second thickness for a second transmittance of about 90% to 99%, which is analogous to instant second thickness D_3 at clear areas) between densely spaced features 44 (Figure 6, c4/L28 to c5/L14). The reduced thickness of attPS material 43 at positions 46 between densely spaced features 44 provides improved image quality, while avoiding the necessity of an optical proximity correction (OPC) method (c5/L14-19).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention in the method of manufacturing an attPSM that includes thinning an attPS layer from an initial or default thickness (D_0) to a first (adjusted) thickness (D_1, such that $D_1 < D_0$) before patterning clear areas in the attPS layer (as taught by Doi et al.) in order to make an attPSM blank designed or adapted for a first predetermined PS and (optical) transmission (T_0) at a first wavelength (λ_0) of exposure light suitable for a second shorter target wavelength (λ_t) by thinning the attPS layer (as taught or suggested by Dove et al. or Mitsui et al., *[1]*). In the method of manufacturing the attPSM taught by Doi et al. and either Dove et al. or Mitsui et al., it would also have been obvious to remove only a portion of the attPS material having a first thickness (D_1) at clear areas of the attPSM so that a part of the attPS layer with a second thickness (D_3) remains at the clear areas of the attPSM, wherein the second thickness is less than the previous first thickness of this layer ($D_3 < D_1$). This is at least because the remaining reduced thickness of the attPS layer at the clear areas between closely spaced features provides improved image quality, while avoiding the necessity of an optical proximity correction (OPC) method (as described by Chen, *[2]*). Furthermore, in the method of manufacturing the attPSM taught by Doi et al., either Dove et al. or Mitsui et al., and Chen, it would have been obvious to use a prefabricated attPSM blank designed for a first predetermined PS and (optical) transmission (T_0) at a first wavelength (λ_0) of exposure light (e.g., obtained from a first company, etc.) for separately making or adapting (e.g., by a second different company, etc.) this prefabricated attPSM blank suitable for a second shorter target wavelength (λ_t) by thinning the attPS layer before patterning the adapted attPSM blank to make an attPSM suitable for the second shorter wavelength (λ_t), because it is a known and even a common practice (as taught by Hasegawa et al.

or Itoh, and Tanaka et al.) for a prefabricated mask blank (such as an attPSM blank, e.g., made or supplied by a first company, etc.) to be patterned and adapted (e.g., by a different second company, etc.) for making a patterned mask (such as an attPSM). Additional motivation for this combination is derived from Tanaka et al., because the cost of a prefabricated mask blank designed for use with a longer exposure wavelength (e.g., λ_0 = 193nm, etc.) is less than the cost of a prefabricated mask blank designed for use with a shorter exposure wavelength (e.g., λ_t = 157nm, etc.), while normal mask blank remanufacturing is known to include thinning of the mask blank *[3]*.

Claims 42-47 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doi et al. (US 5,527,647), in view of Tanaka et al. (US 2002/0022184) and either Hasegawa et al. (US 6,677,107) or Itoh (US 2003/0184721), further in view of either Dove et al. (US 5,939,225) or Mitsui et al. (US 6,242,138), further in view of Chen (US 6,274,281), and further in view of Jin et al. (US 6,524,755).

While teaching various aspects of the instant claims (including a PS of 180°, *instant claim 44*, and a transmittance (T), e.g., T = 5% to 15% (in a relatively dark area), etc., at the desired wavelength of exposure light, *instant claims 45-47*), Doi et al., Tanaka et al. and either Hasegawa et al. or Itoh, either Dove et al. or Mitsui et al., and Chen do not specifically teach the instant equations for determining phase shift and transmittance at first and second thicknesses of the attPS layer before reducing initial thickness of the attPS layer to a first thickness and patterned etching of the attPS layer to a second thickness (as recited by *instant claims 42-43 and 53*).

However, these equations are known relationships, as taught by Jin et al. Jin et al. teach methods of making attPSMs having desired optical transmission (T) and PS function (attPS) at various wavelengths (λ) achieved by controlling optical properties and thickness of constituent film layers (title, abstract). Figure 12G shows T=5% to 15% through (dark) attPS layer(s) versus T=100% for etched clear areas through a substrate. The desired or predetermined transmission is given by:

$(T_{1,2}) = T_0 \exp[-4\pi k_t D_{1,3}/\lambda_t]$, where $T_{1,2}$ represents either a first transmission T_1 at a first thickness D_1 or a second transmission T_2 at a second thickness D_3, T_0 is a constant initial value for T through the attPS layer at an initial thickness D_0 (which appears to be analogous to the instant A_t), k_t is the complex part of the refractive index of the attPS layer (which is an optical property believed to be equivalent to the instant extinction coefficient), and λ_t is the desired or predetermined wavelength of exposure light. The total phase delay through a multilayer structure, such as an attPSM, is given by:

$\Phi_{total} = \Phi_{1,2} + \Phi_S = [(n_1-1)D_{1,3} + (n_2-1)D_S]2\pi/\lambda_t$, where, Φ_t represents the total PS through plural layers ($\Phi_{1,2}$ is either a first PS at a first thickness D_1 or a second PS at a second thickness D_3 and Φ_S is the PS for the substrate having a thickness D_S), n_1 and n_2 represent refraction indices for the layers, π radians is equivalent to 180°, and λ_t is the desired or predetermined wavelength of exposure light (c8/L63 to c9/L19, with adaptations made to simplify comparison with the instant claims). Since the transparent substrate has the same thickness and optical properties under both the clear etched areas at a second thickness of the attPS layer and the dark areas at a first thickness of the attPS layer, the expression for the total phase delay **difference** (in degrees rather than radians) between the clear and dark areas ($\Phi_t = \Phi_1 - \Phi_2$) can be simplified

and rearranged to that for a single attPS layer (having $n_1=n_t$ at λ_t) patterned by etching, which is given by:

$\Phi_t = \Phi_1 - \Phi_2 = [2(n_t-1)(D_1 - D_3)/\lambda_t]180°$ (which reads on *instant claim 42*). Figure 13F shows gradual thinning of an attPS layer 137, which is then followed by another etching step to etch further (e.g., into the substrate, etc.) to achieve a 180° phase shift depth, as shown in Figure 13G (c15/L30-37).

It would have been obvious to one of ordinary skill in the art at the time of the invention in the method of making the attPSM taught by Doi et al., Tanaka et al. and either Hasegawa et al. or Itoh, either Dove et al. or Mitsui et al., and Chen to use the instant equations for determining phase shift difference (Φ_t) between clear and dark areas of the attPSM and transmittance at first and second thicknesses (T_1 and T_2, respectively) of the attPS layer at the target or predetermined second wavelength (λ_t) before reducing initial thickness (D_0) of the attPS layer to a first thickness (D_1) and patterned etching of the attPS layer at clear areas to a second thickness (D_3, in accordance with the equations taught by Jin et al.), in order to prevent overetching and allow planning or predetermination for the desired extent of reduction in thickness (thinning) of the attPS layer from the initial thickness (D_0) to the first thickness (D_1 that remains at dark areas), and then further selective reduction in thickness only at clear areas by patterned etching to result in achieving the desired PS difference between dark and clear areas (preferably close to 180°, *instant claim 44*) of the attPS layer, while also ensuring the predetermined amount of transmittance (e.g., T of about 5% to 20%, etc., *instant claims 45-47*) at the target or predetermined second wavelength (λ_t). This is at least because Jin et al. teach that such equations for transmittance and PS through an attPSM are known (reading on *instant claims 42*

and 53). It would also have been obvious to reduce the thickness of the attPS layer from the initial thickness (D_0) to a first thickness (D_1 that remains at dark areas) before further patterned etching to a second thickness (D_3, as shown by Jin et al.), because this would provide a reasonable expectation of success for carefully controlling the PS difference (e.g., $\Phi_t = 180°$, etc.) between the first and second thicknesses (D_1 at dark areas and D_3 at clear areas) of the attPS layer (*instant claim 43*).

Response to Arguments

Applicant's arguments on pages 9-15 of 15 of the current amendment with respect to claims 40, 42-50, and 53 have been considered, but they are either moot or unpersuasive in view of the new or revised ground(s) of rejection set forth above, which have been necessitated by Applicant's current amendment.

On pages 11 and 14, Applicant seems to repeat the earlier suggestion that too many references were used in the art rejections. In response to Applicant's arguments that the examiner has combined an excessive number of references, reliance on a large number of references in a rejection does not, without more, weigh against the obviousness of the claimed invention. See *In re Gorman*, 933 F.2d 982, 18 USPQ2d 1885 (Fed. Cir. 1991). Applicant argues that 7 references (on page 11) or 8 references (on page 14) were combined together in the previous obviousness rejection(s). However, either Hasegawa et al. or Ito as well as either Dove et al. or Mitsui et al. were cited alternatively, so that in the first obviousness rejection of claims 40 and 48-50 set forth above only 5 separate references are relied upon, while in the second obviousness rejection of claims 42-47 and 53 only 6 separate references are relied upon.

In addition to the teachings of Doi et al. and the other references discussed in the rejections set forth previously and revised in this Office action as shown above, it is emphasized among the specific teachings of Tanaka et al. that the cost of prefabricated mask blanks adapted for use with shorter exposure wavelengths are more expensive than those adapted for use with longer exposure wavelengths [0004] and that normal mask blank remanufacturing is known to include thinning of the mask blank [0007].

Dove et al. teach that a first thickness (initial thickness, D_0) attPS layer suitable for a desired transmittance (e.g., T = 5% to 15%, etc.) at a first wavelength (λ_0) is known to be made suitable for the same desired transmittance T at a second wavelength (λ_t), which is shorter than the first wavelength (reading on $\lambda_t < \lambda_0$), by simply reducing the thickness of the attPS layer (Figures 6, 8, and 10, c4/L29-49, c5/L7-11, e.g., from an initial thickness D_0 to a thinner first thickness D_1, etc.). Alternatively to Dove et al. are the similar teachings of Mitsui et al., which indicate that the optical transmission (T) of an attPS layer decreases for shorter wavelength exposure light, but also that T increases with decreasing thickness of the attPS layer while the amount of PS remains nearly the same. Thus, one of ordinary skill in the art would have a reasonable expectation of success for predictably compensating the loss of T through an attPS layer thickness designed for a first wavelength (λ_0) exposure light when using a second shorter wavelength (λ_t) by simply reducing the thickness (e.g., from an initial thickness D_0 to a thinner first thickness D_1, etc.) of the attPS layer on a mask blank.

Chen teaches thinning of an attPS layer at clear areas (e.g., to a thickness D_3 where $D_3 < D_1$, etc.) without removing the entire thickness of the attPS layer and without etching the

underlying transparent substrate of an attPSM (just as required by the instant claims), in order to provide improved image quality (e.g., in the clear areas between densely spaced features, etc.).

On pages 11-12, Applicant concedes that it is well known for prefabricated mask blanks to be made by various different entities, including the same manufacturer or different manufacturers, and may be made at different times or locations than the final patterned masks (as previously and still supported by either Hasegawa et al. or Itoh).

This well-known and undisputed fact in combination with the economic motivation provided by Tanaka et al. and other teachings provided by the other references cited (as described above), would have lead one of ordinary skill in the art at the time of the invention to consider and even to pursue the instant remanufacturing of prefabricated mask blanks designed for a first longer wavelength, in order to make them suitable for a second shorter wavelength (e.g., by simply thinning of the att-PS layer on a prefabricated att-PSM blank, etc.), before patterning the remanufactured mask blank to make a final patterned mask (e.g., an att-PSM, etc.) that is suitable for the second shorter wavelength.

In response to Applicant's arguments on pages 11-14 against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In this case, each of the art rejections rely upon a combination of several references, each of the references cited for specified reasons as indicated above.

In response to Applicant's arguments on pages 11-14 that some of the references cited do not provide teachings covered by other references, the test for obviousness is not whether the

features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

At the top of page 10, Applicant admits that the combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results (citing *KSR Int'l Co., v. Teleflex, Inc.*). On the following pages, Applicants argue that the prior art references relied upon do not specifically teach reclamation or remanufacturing of a prefabricated mask blank by thinning an original thickness att-PS layer thereon designed for a longer wavelength so that it can be used to make an att-PSM suitable for a shorter wavelength. However, it is still believed that the instant invention as claimed would have been obvious to one of ordinary skill in the art, because the claimed invention does no more than yield predictable results in view of the cited prior art references when taken together in combination (as relied upon in the rejections set forth above).

Therefore, the instant remaining claims 40, 42-50, and 53 are still held to be obvious over the combinations of cited prior art references for at least the reasons set forth above.

Conclusion

The prior art made of record, which is not relied upon, is considered pertinent to Applicant's disclosure. Smith (US 2003/0077520) teaches either the same or at least similar attPS materials for an attPSM ([0019]-[0020], [0052]-[0053]) to those listed in the instant specification at [0030] lines 5-6.

Applicant's amendment necessitated the new or revised ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Ruggles whose telephone number is 571-272-1390. The examiner can normally be reached on Monday-Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

jsr

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